

**Uranium Mining in
San Juan County, Utah:
Compromises & Conflict
in an Age of Prosperity**

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Uranium Mining in San Juan County, Utah: Compromises & Conflict in an Age of Prosperity

At the turn of the 20th century in San Juan County, Utah, life was simple. With few roads besides those carved by the wheels of horse-drawn vehicles and with little economy beyond agriculture and ranching, the county was – needless to say – rural and remote. It was a time when yards were comprised of sagebrush, items were purchased at the local “mercantile”, and a time when the food on a man’s table was earned by the sweat of his brow. Little did the people of that era know about the force that would soon change their idyllic world – uranium. Of course, it would take some time for San Juan citizens to recognize this fact; after all, as one historian stated, “At that time, uranium was not considered of any great value. It [would be] over twenty years before its value became known” (Young 4).

In November of 1933, an article published in the county newspaper foreshadowed the impact of uranium. The headline read, “Uranium Ores Said to Be Developed in Near Future” (Uranium). Only one line, tucked away on page eight of the *San Juan Record*, hinted at what was to come. Although uranium would not make its debut as a high-demand, commodity substance until the early fifties, it would wait patiently for the rest of the world, and more poignantly, for rural San Juan County, to realize its importance.

To fully comprehend uranium’s impact on the county, though, requires a more complete understanding of the region – after all, by the time the uranium boom rolled around, mining in San Juan already had an established legacy. Starting with Blue Mountain gold mines in the 1890’s, early miners planted a tradition of “digging in rock” that was slow to leave the county. When early gold mines proved to be unprofitable, miners began exploring ores of carnotite – a mixture of vanadium and uranium – that were found in the region (Shumway 267). Due to Madame Curie’s discovery of the highly radioactive element radium in 1898, and the subsequent research by private scientists all over the world, medical functions for radioactive elements created a demand for radium. San Juan miners enjoyed a brief period of stability as carnotite was processed for the radium - up until 1922, that is - when the radium market was stolen by Belgian mining companies (Shumway 270). Not to be discouraged, mining picked itself up again

when vanadium, also commonly found in the area, was discovered to be a useful alloy in strengthening steel.

The first vanadium mill, built in 1937, was located in Cottonwood Canyon, near Blanding, Utah, and was able to process 15 tons of ore per day. Production came to a halt that same year when a destructive fire consumed the mill. However, by 1938, it was rebuilt, and production was at 40 tons per day (Young 4). That mill, along with several others established by the Vanadium Corporation of America, became a significant source of economy to miners, as well as the outlying towns nearby. At almost that exact moment in 1939, on the other side of the country – renowned genius Albert Einstein sent a letter to President Roosevelt, strongly urging the U.S. to invest in nuclear research and the development of an atomic bomb (Einstein 2). In what seemed to be an action contrary to this recommendation, however, government funding for the development of carnotite ores was discontinued in 1944 (Young 6). San Juan miners thought they would have to finally call it quits – and for a while, most did. Little did miners at that time know that things would all change following the Manhattan Project, World War II, and its climactic end in 1945 – the atomic bombing of Hiroshima.



The First Atomic Bomb
Source: National Archives

Seeing the need for added homeland security, the government developed plans for standby-uranium. In 1946, congress passed the Atomic Energy Act, declaring governmental control of uranium development. Within five years, federal funding for the element began rolling in to entice the speedy extraction of ore. By the early fifties, uranium mining in San Juan County experienced heightened momentum. For the county,

this represented the beginning of a significant period of time – a time that would usher in prosperity, conflict, and everything in between.

Prosperity

In 1951, a young petroleum archaeologist by the name of Charles Steen came to San Juan County. After making 15 claims near the Lisbon Anticline, he set to work. A year and a half later, he still had no ore, his family was living in abject poverty, his drilling rig was broken, and no one would sell him parts. Deciding to make one final attempt, Steen accepted money from his mother, who had mortgaged her home, and fixed his rig one last time. He drove out to his Mi Vida claim, started drilling, and a few feet short of typical uranium depth the diamond bit on the rig gave out. With no way to fix it and no money to buy a new one, Steen faced the inevitable – he would never find ore. He packed up the rig, threw in a few of the core samples he had just dug, and headed towards home. Stopping in town on his way back, he decided to test his samples with a Geiger counter as a bit of a joke, believing his samples to be worthless. To his surprise the needle shot up on each piece: his ore, by mining terms, was HOT! Charles Steen had just discovered one of the largest uranium veins in the county. By fall of 1953, the Mi Vida mine had produced over a million dollars worth of ore, and the man who once found himself in the midst of financial ruin was now wealthy beyond his wildest dreams (Shumway 287-288).



“Uranium King Charlie Dressed for Action”
Source: *Mine Life*

Steen would not be the only one to find monetary benefit in mining, however. The county, as a whole, witnessed the effects of a new source of income – between taxes on the uranium sold, money gained on filed claims, and the simple economy boost of a heightened population, the county was able to garner enough money to begin renovations in transportation, education, and healthcare.

The first of these renovations targeted county roads; after all, the sudden boom in mining created a need for better roads to haul ore, as well as the means. According to 1945 reports by the State Road Commission, only 41 miles of graded road existed in San Juan County and were maintained exclusively by the state. By 1954, miles of graveled road increased from 175 to 338; and oil-surfaced roads climbed from 5.5 miles to a whopping 156 (Haymond 237). County Road Surveyor, Bernal Bradford, made the statement, “[The county was] willing to help the miners any way they could. As far as building the roads, they couldn’t do it *just* for the miners. The county never built any roads into the mines, but once they were put in, we did upgrade them, smooth them up and make them passable.” The county wasn’t the only one working on expanding road systems, though. In 1951, seeing the need to transport uranium quickly and efficiently, the Atomic Energy Commission had “rented” state equipment and laborers to construct a road from Blanding to Natural Bridges that connected with the Hite Ferry crossing (Powell 235). What did all of this sudden improvement mean for the county? It meant access to areas previously unattainable, connection to out-of-county cities, and faster travel to schools and healthcare services.

The financial transformation created by uranium mining led to significant improvements in county medical services and healthcare. At the time, the only medical facility was a small hospital in Monticello, a building previously vacated following the vanadium boom of the 1930s. With revenue from taxes on uranium mines, County leaders decided to create new and improved facilities. The San Juan Hospital, with its 24 beds, ER, surgery room, lab, and maternity ward, opened its doors for service in 1961. A year later, when a \$60,000 post-construction surplus was discovered, a clinic was also established in Blanding. Although small, the creation of such facilities represented a significant shift towards the self-reliance of the county, and an increase in citizen health and well-being.

A spike in attendance of San Juan schools was also seen during this time, as total enrollment surged from 800 in 1948, to 1,800 ten years later (McPherson 283-284). With the need for schooling in high demand, in combination with the county's newfound resources, both Monticello and Blanding received new buildings. The 50's and early 60's saw the formation of schools in La Sal, Bluff, Montezuma Creek, and Mexican Hat. Reta Bartell, former Elementary Supervisor for the district, commented, "We became known as the 'Rags to Riches School System'" (Bartell). Zenos L. Black, former Superintendent, expounded upon this statement, "In 1943 the valuation of the county was just over \$3 million. After the [discovery of] uranium ore in the county, the valuation rose to a high of \$134 million. In a few short years, San Juan School District had risen from the poorest school district per capita to the richest" (Black). These schools, with the education and supplies they gave, provided a much needed service to children who attended.

Compromise & Conflict

Although mining ushered in a time of prosperity and improvement throughout much of the county, it was not without its downfalls and compromises; and, as most citizens who experienced those times can attest to, it was fraught with danger and by no means exempt of consequence. Stories are still retold by living relatives of miners who were caught by cave-ins, injured or killed in explosions, or permanently affected by lung conditions caused by the endless dust experienced in early mines. The pull of financial security that mining provided was in constant conflict with the dangers it presented.

One of these instances occurred in 1964. Burdett Shumway was working with several others when the dynamite they were placing exploded early. The two men nearby managed to escape, but Burdett was killed immediately. Kenny Shumway, Burdett's brother who was working on a nearby mine, recalls the day it happened. *"As I got there the old yellow smoke was coming out of the mine. I just ran into the mine... [t]hat probably wasn't very smart of me. [But] I found Burdett... It was a pretty sad situation"* (Wilcox 53). Burdett Shumway left behind a wife, seven children, and one more on the

way. Mining didn't just affect the miners and the county – it affected everyone, and not always in the best of ways.



Miner Jed Tate in Hospital after Mine Explosion

Source: Personal Photograph, LaVerne Tate

Another negative effect of uranium mining would not be seen for many years to come –the effects of continued exposure to radiation. Families across the county openly blame years of mining for the death of loved ones by cancer. Today, only a handful of the original uranium miners who have witnessed radiation's effect still remain.

Surprising as it may seem, some fail to do. Miner Glen Shumway, when asked whether miners feared radiation, is quoted as saying, "I don't think miners ever worried about radiation then and they don't worry much about it now. Fear of radiation has ruined the industry" (Shumway 8). Another miner, Kenneth Bailey also said, "Nobody worried one whit about low level radiation and I don't personally worry about it one whit now! [T]hose opposed to nuclear power use all the untruths and scare tactics they can muster" (Muhlestein 56).

Of course, the truth is much more frightening. In an online article entitled "Navajo Uranium Radiation Victims", the US Department of Labor is quoted as saying, "Radon daughters tend to attach to respirable dust... [w]hen a miner inhales this air, part of the dust is deposited in the lungs and breathing passages, where the radon daughters continue to decay, emitting alpha radiation, which damages lung tissue" (Richardson). Anglo and Native American miners experience this condition alike, as the accumulated

effects of long-term mining wreak havoc on their lives. Through the work of unions, the Radiation Exposure Compensation Act passed in 1990, offering government compensation for deaths and disease (Cancer). Still, financial compensation can hardly bring back the dead or fix a ruined body, and many have voiced the thought that it is too little, too late.

The final blow to the county is one with even more far-reaching effects: that of environmental hazards. As of this year, one can still find three-inch, multiple volumes of current EPA reports at the public library detailing conditions and plans for management. Reclamation is a relatively new idea to come to the county – suggested a scarce 11 years ago, it is something that has continued well past 2000. It is something, though, well worth its time. Old mines have not only presented accident dangers, but have been proven to be seeping radiation into nearby soil and water supplies (Huppe 5). Additionally, homes built with uranium tailings still dot the Utah portion of the Navajo Reservation and continue to pose health hazards to their occupants (Tohtsoni). The struggle to fix these problems is one that must be pushed forward, if the county ever hopes to correct its past and form a safe future.



Native American Miner

Source: *Blue Mountain Shadows*

Conclusion

In 20/20 hindsight, it is easy to look back and see the problems mining caused, but it must be equally recognized that mining is what *made* this county; it is what *made*

our country during that time of discovery and war. Uranium brought about the development of important county resources, and with the reopening of the White Mesa Mill in 1980 and the lingering effects of past mining, it is something that affects our county still today. From a wider perspective, uranium was a driving force behind the Cold War; uranium is what led to the development of the nuclear power plant in 1951; uranium is what spurred the Remediation Act in 1978, and what caused the tragedy at Chernobyl in 1986 (Hear Our Voices). Now, with the rising costs of energy, our country is forced to re-examine the use of uranium (Moran C1). Ultimately, our nation must weigh the compromises and effects of the past with the benefits for the future. The *least* that can be said of uranium mining is that it has left a mark. For better, for worse, the effects of mining are here to stay. Its impact is permanent and rooted as deeply in the county as the ore that caused so many changes. At the turn of the century, citizens may have been ignorant, for whatever reason, of the influence and conflicts uranium would bring about but *WE today are not*. The only thing left for the county to do now, is to move into the future and accept uranium for what it is – a force of change.

BIBLIOGRAPHY

Primary

Bailey, Kenneth. Interview. "Western Mine Supply, The Maybe Mine, and Other Experiences in the Uranium Boom." Blue Mountain Shadows 26 (Winter '01-'02): 56-70.

Explains the functioning of the uranium penny stock market – something I had no knowledge about before. Also describes some unique views on the effects of radiation – as a miner who never experienced negative health consequences, Bailey is quick to say in this interview that he doesn't worry about radiation, and that any circulated reports by people of harmful effects are "scare tactics...to advance their own agendas." Explains how miners of the time were unaware of any possible radiation danger.

Barr, Paul. Personal interview. 1 June 2007.

I initially went to Mr. Barr, San Juan County Treasurer, hoping to find out the amount of tax revenue generated by the uranium industry within the county. Mr. Barr allowed me access to the past seven years of tax records, and explained to me how the taxes generated by "metalliferous mining" is distributed throughout the county, and how the assessed value of a mine, unlike residential or business property, fluctuates according to the production of the mine.

Bayles, Clark. Interview with LaVerne Tate. 17 April 2001. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

"BMS," or in other words, "Blue Mountain Shadows" is a county-wide journey that tracks the history and advancements of San Juan. They conducted a research project on uranium mining within the county. The project was sponsored by the Bureau of Land Management, USDA Forest Service, and in cooperation with the Utah Division of Oil, Gas, and Mining. I was fortunate enough to be able to get a hold of a disc copy of the interviews and pictures that their organization had collected. This interview tells about the interesting aspects of mining life – what it was like to hit a body of ore, the average amount of pay, and the going price of "yellow cake" (processed uranium) - \$45 per pound during the boom and \$10 after. Some of Bayles' story turned out to be unnecessary for my research, but other parts such as the accidents Bayles witnessed fit in with my topics quite well.

Bayles, Donald. Interview with LaVerne Tate. 22 March 2001. Taken from the BMS CD of Mrs. Janet Wilcox on March 27, 2007.

Explains what mining on San Juan county Native American reservations was like – the conditions and locations. This gave me a better understanding of one way uranium mining affected roadways in the county – as roads became frequented by heavy-loaded trucks, improvements became a necessity in order to preserve road quality.

Black, Don. Interview with Helen Shumway. 25 January 2001. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

This helped me by describing the financial changes experienced during the uranium boom; while Black did not notice much of a change in his own economic status, he tells of how the county did see an influx of dollars as more jobs became available. Also explains landscape changes during the time as mining camps were established.

Black, Glen. Interview with Adrian Shumway. November 1989. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

As a private roadway constructor, Glen Black was no stranger to the conditions of roads within the county. His comments on the difference between roadway maintenance then and now contributed to my knowledge of one of the key topics I chose to concentrate on in my display.

Black, Glen C. Interview with LaVerne Tate. 26 February 2001. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

Initially, I thought this interview would contain more crucial information than it did. However, it did tell of an accident that pertained to my topic of mining injuries, so in the end, it turned out to have a good deal of beneficial information I had not suspected.

Black, O Frost. Interview with Steve Wilcox. 7 February 2001. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

Describes Black's work and extensive experience as a private roadway constructor for miners during the uranium boom. A surprising piece of information also showed up in this interview regarding Frost's opinion of how mining has affected the county financially, and how San Juan's economic state tends to follow the path of a roller coaster between instability and wealth. It was work done by O Frost Black that led to the discovery of the Payday mine, an important and very prosperous mine in our region. O Frost Black, according to another miner, "probably built more roads out here into the mines than anybody," and it helped tremendously to read his account.

Blickenstaff, Eugene. Interview with Harry Henslick. 22 July 1970. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

Describes the mining industry as it developed. This interview, while not entirely relevant, provided a good background for my research. What made this interview most interesting to me was the fact that Blickenstaff moved to the county from California in 1937, and was able to explain how the uranium boom came about. I also found it interesting to find out that Blickenstaff had initially come on a temporary basis to mine, but after marrying a local girl, converting to the LDS religion, and falling in love with the

region, he permanently located and established his family in the heart of the county. This “outsider turned local” viewpoint provides a new look at uranium mining in San Juan.

Bradford, Bernal. Interview with Kay Shumway. 23 January 2001. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

Bernal Bradford was recognized as an important county road surveyor during his lifetime. He also happened to be my neighbor. His interview furthered my understanding of the change seen in roads during peak uranium years, as well as his opinion of how the uranium boom affected San Juan county and the miners within. Quite possibly due to his exposure during his mining years, Bernal Bradford developed lung cancer during his lifetime and had a lung removed. Just this year, our community shared a sense of loss as he died of the related effects of his cancer, and subsequent health problems.

Einstein, Albert. Letter to Franklin D. Roosevelt. 2 Aug. 1939. Albert Einstein Letter to F.D. Roosevelt (Nuclear Capabilities). Franklin D. Roosevelt Presidential Library, Hyde Park, NY. Accessed Mar. 2008.

<<http://www.fdrlibrary.marist.edu/psf/box5/a64a01.html>>.

Original document scan of a letter from Albert Einstein to President Roosevelt, urging the president to take action in the development and research of an atomic bomb. Einstein expounds upon the growing threat of Nazi-Germany research into the nuclear capabilities of uranium, and bluntly sums up the fact that Germany had begun accumulating uranium stores from the mines in Czechoslovakia that had been seized by their forces.

Hurst, Elmer. Interview with LaVerne Tate. 27 March 2001. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

This interview was particularly interesting as it described the poor ventilation procedures that were seen during the uranium boom. This interview also described how the government regulations concerning uranium mining made it difficult for small and independent mining companies to survive – tightened rules meant greater expenses, expenses that private miners struggled to keep up with.

Hurst, Elmer & Hurst, Lea. Personal interview. 31 May 2007.

A miner during the uranium boom with 17 years of experience under his belt, and a former school teacher drawn to San Juan School District because of high pay as a result of county prosperity, this couple seemed the perfect resource for my project. I was able to learn about teacher salary differences during the uranium boom in San Juan compared to Salt Lake City; I was also able to learn about different jobs were brought to the county as a result of mining. This interview discusses how mining affected *everyone* within the county, and how it continues to play a key role today.

Hutchins, Jim & Harry. Interview with LaVerne Tate. 30 January 2001. Taken from the

Blue Mountain Shadows Collection. 27 March 2007.

Presented a unique glimpse at the life of a Native American miner. This contained some shocking facts – Hutchins says that they were given water from the mining pit and nearby sources to drink, that they had no ventilation, that the children would occasionally play near the mines, and that he would often catch rides into town on the back of a truckload of uranium – with dust blowing the whole time. A bit of startling knowledge.

Jones, Cardon. Interview. “Cardon Jones.” Southeastern Utah Project. Utah State Historical Society and California State University. 20 July 1970. Fullerton, California: The Oral History Program of California State University, 1987.

Originally a rancher, Jones quit his previous employment because he was “...sick and tired of working for nothing.” Between ranching and mining, though, Jones spent his time exploring the region, and he tells of one time in particular where he led a small group of head geologists from Washington, D.C. on a tour of the country. Not only did the geologists come to view the county, they had come to document the spectacular scenery of southeastern Utah. “These Canyonlands [National Park] were and outcome of that,” he remarks. This book was lent to me by Jones’ daughter, a close neighbor of mine.

Jones, David. Interview with LaVerne Tate. 14 March 2001. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

This provided another interesting Native American viewpoint, as Jones describes his early-life code-talking during WWII, and his later jobs in the mining industry. He tells of the conditions faced while mining, and procedures. A new angle to the world of uranium mining. Less than I initially expected; language barriers and memories faded with time made the interview not as informative as I had hoped, but it was helpful nonetheless.

Jones, Wendell. Interview with Melody Bradford. 5 February 1991. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

While this interview may be one of the shortest I read, it nonetheless describes the conditions of the time, and tells how little was known by miners in regards to the dangers and effects of radiation, uranium dust, and cancer. This interview tied in very well to one of my topics in particular – radiation. The truth was, very few people knew its effects, and there were many people who paid the price for that lack of knowledge.

Lyman, Austin & Lyman, Ray. Personal interview. 25 May 2007.

I visited a rock shop in town, owned and operated by Ray Lyman. He gave me two small samples, which I mailed to Alexandria, VA to be used for the exhibit (the Transportation Security Administration won’t allow them on the plane.) It turns out he is not only a rockhound, but a former uranium miner himself. He was at a nearby mine when fellow

miner Burdett Shumway was killed. He used his Geiger counters to show us the level of radiation in the rock samples he has in his shop. He discussed the rising prices of uranium; he himself has staked new claims. He said, "It's [uranium mining] going to be BIG again, you wait!"

Shumway, Glen. Interview. "Uranium Mining in San Juan: A Father and Son Remember." Blue Mountain Shadows 26 (Winter '01-'02): 3-13.

Told about the conditions, equipment, and procedures followed by early miners. Described accidents Shumway had witnessed during his mining years, as well as explaining his intriguing attitude towards radiation – "I don't think it is nearly as hazardous as some people... think. Fear of radiation has ruined the industry."

Shumway, Merri Black. Personal interview. 5 June 2007.

Mrs. Shumway is the president of the San Juan School District Board of Education. She had loads of information. Her father, Calvin Black, was a uranium prospector who made a lot of money during the first boom in the 1950's. He served 20 years as San Juan County Commissioner, and later as state legislator. He lobbied for a bill that would allow counties in the state to put money in a trust fund, capped at \$7.5 million. He knew the tax revenue San Juan County was enjoying from the uranium boom couldn't last forever; the trust fund now generates interest income that allows the county to operate at a comfortable level.

Slade, Terry. Personal Interview. 4 April 2007.

Another neighbor of mine involved in the mining industry, Terry Slade works at White Mesa Mill (15 miles south of my home town), where ore and "alternate feed sources" are still processed for uranium today. Terry Slade has been working at White Mesa Mill since 1989, and helped me understand regulations, radiation, and the processing of uranium. His information helped me understand the difference between alpha, beta, and gamma radiation as well.

Smith, Don. Personal interview. 5 June 2007.

Dr. Smith is a geologist who teaches at College of Eastern Utah – San Juan Campus. He was formerly employed at the White Mesa Mill during the 70s and 80s. He is a former uranium miner who staked claims at the Blue Lizard and White Canyon, across from the famous Markee Mine, located in San Juan County. He had some great stories to tell of his adventures with his mining partner, Boyd Bradford and their search for mining claims. He told of one time while he and Boyd were exploring that they actually found an old mine being used to grow cocaine – crazy stories definitely make for a better history lesson! He also explained how a claim is staked, recorded, and maintained.

Tate, Bryan. Interview with LaVerne Tate. 10 February 2001. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

Tells of one accident in particular in which Bryan Tate was involved that resulted in a hospital stay, with highly radioactive “hot rock” uranium ore pieces lodged inside of his back. A bit gross to read about, as Tate describes how those pieces later surfaced and how his sister had to pick them out of his back as they would appear.

Turk, David & Terry Slade. Personal interview and tour. Denison Mines (aka White Mesa Mill. Blanding, UT. 7 June 2007.

After interviewing Terry Slade, I wanted to get an inside look at the workings behind the White Mesa Mill. And while I was able to talk with Mr. Slade and Mr. Turk on this date, I was unable to tour White Mesa Mill since I am not yet 18, and company policy at the mill does not allow anyone under 18 to enter the mill site. Instead, my mom went and toured the site with a cassette recorder and a digital camera (with clearance from Denison Mines management), allowing me to experience much of what happened while she was there. This interview and tour provided me with a better understanding of what happens at the mill – the process that ore undergoes in order to become purified uranium. It was also interesting to see that the exact equipment put into the mill during previous uranium booms is still in use – the laboratory is easily dated. David Turk showed the volumes of safety regulations they must stay current on. Photos of the chemistry lab, samples of U238 (high-grade uranium), chemical tanks, leaching ponds, and processing warehouse were taken. Another interesting aspect is that many holding tanks were empty – when asked if this was because the mill was not producing at full capacity, Slade responded, “Oh, no. This is all new equipment we’ve just recently added. Big things are happening. All I’m allowed to say... is that I’m not at liberty to say.” Denison Mine Rocks!

Washburn, Lark L. In Search of the Mother Lode: Lark L. Washburn’s Life History. Southeastern Utah Project. Utah State Historical Society and California State University. 22 July 1970. Fullerton, California: The Oral History Program of California State University, 2005.

Contained interesting information on Washburn’s personal opinions of new regulations – “do-gooder projects,” as he calls them. He recalls his days spent mining, and relates his current status as “independent contractor,” a job mostly involving the mechanical workings or mining gear. This helped me understand a reoccurring sentiment expressed by old miners everywhere – “The little miner just can’t make it anymore with all these new regulations.”

Yanito, David. Interview with Cleal Bradford. 11 April 2002. Taken from the Blue Mountain Shadows Collection. 27 March 2007.

Provides the perspective of life as a Native American miner. Describes the day-to-day life while working at the mines, accidents experienced while there, and the troubling question of compensation – in this case, for Yanito’s daughter who lived in the mining camps with him and has since developed thyroid cancer.

Secondary

“Atomic Energy Act of 1946.” *US Dept. of Energy: Office of Scientific & Technical Information*. Accessed 4 Feb 2008. <<http://www.osti.gov/atomicenergyact.pdf>>

Discussed the history behind the Atomic Energy Act of 1946 – and declares the full limits of the act itself.

Black, Zenos L. “Education in San Juan County.” *San Juan County, Utah: People, Resources, and History*. Ed. Allen Powell. Salt Lake City, Utah: Utah State Historical Society, 1983.

As the school district superintendent for 24 years during and after the time of the uranium boom, Zenos Black proved to be a note-worthy source. His long-term experience with the school district allows for an accurate assessment of how uranium mining affected the education of our county. This turned out to be an invaluable source and fit perfectly into my topic of education.

Bartell, Reta. “San Juan County Schools.” *San Juan County, Utah: People, Resources, and History*. Ed. Allen Powell. Salt Lake City, Utah: Utah State Historical Society, 1983.

Reta Bartell served as Elementary Supervisor to San Juan School District during the years of the uranium boom, and hence provides an amazing idea of how uranium affected the education of the county’s children as a whole. Bartell describes how the district became known as the “Rags to Riches School System,” as money flowed in from taxes.

“Cancer Scourge Claims Another Life.” *San Juan Record*. 28 Mar. 2007, weekly ed.: 1.

An interesting article, this piece talks about how Monticello planned on taking a radiation compensation plea to Washington D.C. Demonstrates the struggles Monticello has experienced since the glory days of the uranium boom.

Centers for Disease Control & Prevention. *NIOSH Uranium Miners' Health Study*. Atlanta, Georgia: Department of Health & Safety, 1997. 4 Apr. 2007. <<http://www.cdc.gov/niosh/pgms/worknotify/uranium.html>>.

This online pamphlet summarizes a government study conducted to research the effects of uranium mining on white and non-white miners, specifically Native Americans (mainly Navajo). Interestingly enough, a prevalence of lung cancer was found in white miners, whereas Native American miners had lower cancer incidences.

Griscom, Amanda. “Nuclear Falling-Out.” *Environmental News and Commentary*. Posted 3 April 2003. Accessed 1 June 2007. <<http://www.grist.org/news/powers/2003/04/03/fallingout/>>

This article discusses how as heavy fossil fuel use contributes to global warming, the federal government has begun seeking cleaner means of energy. One of these means is the possible resurrection of nuclear plants within the country. Also mentions how nuclear energy was ended in earlier years as a result of nation-wide fears of radiation and disaster (such as was witnessed in the tragedy of Chernobyl).

Haymond, Jay. "San Juan County Roads: Arteries to Natural Resources and Survival." San Juan County, Utah: People, Resources, and History. Ed. Allan Powell. Salt Lake City, Utah: Utah State Historical Society, 1983.

I used this in researching the condition of county roads preceding the uranium boom, and both good and ill effects of such following the boom. Not only did it give me a feel for the conditions of pre-uranium days, it provided me with vital statistics needed to back up my claims within my paper and exhibit.

"History of Uranium

"Hear Our Voices." Larissa Oliver, director and advisor. Written and produced by Monument Valley High School Students. 1998. Funded by San Juan School District and the Utah Arts Council.

Fifteen-minute documentary written and produced by MVHS students (my aunt Rachel went to school with them!) Interviews and on-location surveys of VCA (Vanadium Corporation of America) where uranium mining took place during the years of the Cold War. Tells of how husbands, brothers, and sons suffered ill-effects of uranium mining, and how no one knew the dangers until it was too late. Also describes the poor working conditions and lack of information – one miner recalls eating lunch inside the mine each day without bothering to wash the mine dust from his hands, and drinking water that seeped from the walls of the mine.

Huppe, Kathy. "The Cottonwood Wash Abandoned Mine Reclamation Project." Blue Mountain Shadows 25 (Summer 2001): 5-10.

This work was referenced in context with the effects that San Juan is still experiencing today. It describes the conditions of former mining sites – their dangers and the ill-effects they are continuing to have on our region – and the ongoing process to reclaim the land. In using this, I hoped to demonstrate to viewers the huge, long-lasting impact that uranium has had on the county, and how it continues still.

Jensen, Buckley. "Legacy of 65 Nuclear Years." San Juan Record. 19 April 2006, weekly
ed.: 1+.

Discusses the tremendous amount of money spent on uranium mill and tailings clean-up within the city of Monticello – 20 miles north of my hometown. Already, more than \$225 million have been spent in local area remediation and reclamation activities. This article also describes the incredible efforts of one man, Cal Black, who foresaw the end

of the uranium boom and predicted a need for an alternate source of county income. As a result, a \$7.5 million trust fund was established for the county, which generates enough interest annually to enable San Juan to maintain certain necessities (roads, landfill, etc.), as well as upkeep a few luxuries (city pools, golf course, and sport facilities). This trust fund allowed the county to keep the level of living experienced *during* the boom, *after* the uranium boom. It is this fund which is also a major reducer of taxes, in a county with one of the lowest assessed value rates in the state.

Jensen, Buckley. "Uranium May be 'King' Again Soon Says CEO of Denison Mines." San Juan Record. 4 Apr. 2007, weekly ed.: 1+.

In an exciting article with the promising implications to the county, the President of Denison Mines says, "I foresee San Juan County being the center of the uranium industry in the United States long into the future." This article discusses how White Mesa Mill (being run under Denison Mines, Co.) holds enormous potential as the only federally-licensed and operating uranium mill in the United States. As uranium prices rise, the mill is preparing to update its facility to process refined "yellow cake" as it is called, and increase company employment by 20 percent.

"Manhattan Project." National Atomic Museum. Accessed 4 Feb 2008.
<<http://www.atomicmuseum.com/tour/manhattanproject.cfm>.>

Explained the dates, causes, and events leading up to the creation of the atomic bomb. Located in Albuquerque, New Mexico (home of much of the Manhattan Project testing), this museum is full of information on one of the greatest influences on uranium – federal support, and the single most altering event in the history of the nuclear age – the atomic bomb.

"Manhattan Project." Thinkquest. Accessed 7 Jun 2007.
<<http://library.thinkquest.org/17940/texts/timeline/manhattan.html>.>

Discusses the historical background of the atomic/nuclear age in the U.S. I learned about the people involved in the Manhattan project and the events preceding and following it. Great quotes from some of the researchers involved, and their justification for the creation of the greatest weapon man has ever known.

"Miners Hospital Staff to Visit Grand and San Juan Counties." San Juan Record. 4 Apr. 2007, weekly ed.: 2.

An interesting, real-life look at how uranium has affected miners throughout the county – as more and more miners develop health complications from mining, healthcare compensation is becoming an important topic within the county.

McPherson, Robert. A History of San Juan County: In the Palm of Time. Utah: San Juan County Commission, 1995.

As a history of the entire county, this book includes information regarding healthcare, mining, road construction, education, and general ideas regarding county functioning. I learned tons about how uranium mining has affected our county, for better and for worse. A treasure trove of historical information!

Moon, Samuel. "Tall Sheep: Harry Goulding, Monument Valley Trader." University of Oklahoma Press: Norman and London. Published 1992.

This book explores a wide range of topics that apply directly to the parts of the Navajo reservation that are on San Juan County land. I found this helpful because it relates the account of Luke Yazzie, a Navajo who discovered the location of uranium in various parts of Monument Valley, Utah. Later, he claims, the Vanadium Company of America declared ownership of the claims. Harry Goulding, well known proprietor of Monument Valley conducted the interview and knew Luke Yazzie well.

Moran, Susan, and Anne Raup. "A Rush for Uranium: Mines in the West Reopen as Ore Prices Reach Highs of the 1970s." New York Times 28 Mar. 2007, late ed.: C1+.

This article discusses the renewed interest in uranium as other energy sources become costly, and the impact this has on the industry.

Newell, Maxine. "Charlie Steen's Mi Vida." Moab's Printing Place: Moab UT, 1996.

Explained one of the greatest uranium discoveries of all times – Charlie Steen's *Mi Vida* Mine. Some interesting information about the incredible man who discovered it all – Charles Steen. This was pertinent to my topic because, although Steen lived outside of the county, all of his largest producing mines were located in San Juan – and therefore every dollar of taxes on his mines were paid to San Juan County.

Papich, Bill. "Deposits of Ore, Danger." The Boston Globe 27 Dec. 2000. 25 Mar. 2008 <http://www.navajoboy.com/ore_danger.html>.

This article, first run in *The Boston Globe*, explores the effects uranium radiation exposure had on Native American miners and their families. It also looks at the wide prevalence of uranium-contaminated houses on the reservation and the negative health effects that living so close to tailings has had on tribal members.

"Radon Daughters." Mine Safety & Health. (Feb-Mar 1979).

This was a valuable resource in learning the effects of radiation on miners. It answered a lot of questions I had had about how radiation commonly affects the body, and the exact process that causes cancer in uranium miners. It helped me to better understand that most radiation danger comes from radioactive dust being inhaled, not from being surrounded by radiation.

Shumway, Gary. "Uranium Mining on the Colorado Plateau." San Juan County, Utah: People, Resources, and History. Ed. Allan Powell. Salt Lake City, Utah: Utah State Historical Society, 1983.

This provided an excellent overview of the history of mining in San Juan County. I used it as a reference point for dates, people, and events that surrounded the era of the uranium boom, as well as the things leading up to it. It proved itself to be strong in writing with excellent sources and information. Also told the story of Charles Steen – an amazing “rags to riches” story!

Spangler, Jerry D., and Donna Kemp Spangler. "Uranium Mining Left a Legacy of Death." Deseret News [Salt Lake City] 13 Feb. 2001. Deseret News. 13 Feb. 2001. 4 Apr. 2007.
<<http://deseretnews.com/dn/view/0,1249,250010691,00.html>>.

Describes radiation's effect on the county – lives lost and cancer victims. I learned specifically about members of our community and the legacy they have left behind. They are no longer with us as a result of exposure to radiation during uranium mining efforts. This article echoes the notion that the government knew of the harmful effects of radiation, but didn't tell miners.

Tohtsoni, Nathan J. "Uranium Hogan." Navajo Times. 25 Jan 2001. Daily ed.: E1.

This article described the case of Elsie Mae Begay – the hogan that stands 15 feet away from her current house is radioactive. This article explained the hardships and dangers that Native Americans have experienced *since* the uranium boom, and how intense uranium mining has caused problems on the reservation.

"Uranium Ores Said to Be Developed in Near Future." San Juan Record 16 Nov. 1933. 16 Jan. 2007 < <http://www.lib.utah.edu/digital/unews>>

I found this short article while searching through the county newspaper archives. While it is found online, county archives contain actual PDF files of authentic newspaper clippings dating to the early part of the century. As one of the earliest references I was able to find concerning uranium, this piece caught my attention, and helped me gain an idea of just how *long* uranium has been influencing the county.

Wilcox, Janet. "Mining with the Shumways: A Closer Look at Cottonwood." Blue Mountain Shadows 16 (Winter 1995): 47-54.

Not only is she known as a meticulous writer, Wilcox is also highly recognized as an avid amateur historian. I drew upon this specific piece in writing my research paper, which became the foundation for the present exhibit. Her well-formed piece relates many incidences that occurred during the mining industry's reign, and contains quotes from several firsthand accounts.

Young, Darroll. "Economic Impact of the Uranium Industry in San Juan County." Blue Mountain Shadows 16 (Winter 1995): 3-40.

Based on extensive research, this 37-page account explores the time from before mining to its current state. This piece proved to be invaluable in understanding the long history of mining in San Juan. I used it for dates, as well as in gleaning details of important events pertaining to the uranium industry in the county.

Yurth, Cindy. "Tip of the Yellow Iceberg." Navajo Times. 24 May 2007. Daily ed.: E1+.

Describes the environmental and health impact that the Navajo Nation has experienced in the wake of the nuclear age and its consequences in regard to the tailings and dust left behind by years of uranium mining. Also describes the problem being seen today in hogans across the reservation – radioactivity within the walls of the home itself. Because hogans are covered with clay soil after the final timbers are set, many Native Americans during the time used tailings' dust to mix in with the mortar of the homes because it worked well as a hardener.

Pictures

First Atomic Bomb. 1948. National Archives. Accessed 27 Feb. 2008.
<<http://www.archives.gov/publications/prologue/2004/winter/images/atomic-bomb.jpg>>

Jed Tate. Personal photograph by LaVerne Tate. Date Unknown.

Native American Miner. Date Unknown. Blue Mountain Shadows. 16 (Winter 1995).

Uranium King Charlie Dressed for Action. Circa 1955. Mine Life. 24 Feb. 2008
<<http://www.wma-minelife.com/uranium/articles/art268.htm>>.